

Summary

BAM Wegen bv is a Dutch road construction company which is specialized in the construction and renovation of asphalt road constructions. To ensure that the constructed roads will endure the determined quality and lifetime according to the contract, BAM Wegen bv is continuously innovating its construction processes and involved machinery. Much of the intended quality is determined in the construction process itself. Due to this fact BAM Wegen bv decided to use a special dual layer asphalt paver which is capable of constructing two layers of asphalt simultaneously. This system is called in Dutch "Tweelaags Asfaltspreidmachine (TAS)". Reduction in construction time, enhanced road quality and lifetime, are main advantages of TAS. Another important advantage is when specialized porous asphalt concrete (PA) is applied; a very high level of noise reducing pavements is acquired. This silent asphalt, PA, is used on highways near urban areas. The TAS is very qualified for the construction of these kinds of silent asphalt pavements.

Nevertheless dual layer asphalt constructions produced by TAS do not always meet the quality demands on surface evenness. Sometimes the road shows ripples at the surface as well as variation in layer thicknesses. This phenomenon occurs most often when PA is applied. These effects are obviously undesired. The question is how this problem arises and what should be done in order to avoid the problem. Therefore an analysis of the technical control system of TAS has been conducted as well as a field research on the functioning of the TAS system in practice.

The TAS system is based on a conventional asphalt paver which is extended with a second system that constructs an extra layer of asphalt. This system creates the first layer of asphalt. The second layer is placed by the conventional part of the machine. These two separate systems are merged in their working process. The design of the TAS is such that the construction system for the first layer of asphalt refers to the construction system for the second layer of asphalt. This is done in order to create a constant thickness of the upper layer of asphalt.

Both the technical analysis of the control scheme of TAS and the conducted field research show that the current way of communication between both construction systems for the dual layers of asphalt causes the problem. Variation in layer thicknesses occurs at the moment when the construction system for the first asphalt layer is following the behavior of the system for the second layer of asphalt. It also appears that the connection between both

systems causes that the TAS as a whole counteracts itself continuously and thus resulting in the undesired 'ripple effect'.

The conclusion which can be drawn is that the current control arrangement between the two construction systems for the asphalt layers causes in fact the variation in layer thicknesses as well as the surface ripples. To make sure that these problems do not occur anymore, the control structure for both asphalt layer systems should be modified. The merged working process needs to be evaded in order to avoid counteraction. The most likely solution is that both asphalt construction systems will have their own separate height control system.